patella. As part of an OAI ancillary study, physical activity was measured over a time period of 7 days with an ActiGraph GT1M accelerometer. Physical activity levels were defined based on the 2008 Physical Activity Guidelines for Americans (PAGA): Recommended (≥150 minutes of moderate/vigorous [MV] activity per week acquired in bouts ≥10 minutes), Low (≥1 MV activity bout[s] per week but below guideline), or Inactive (zero MV activity bouts per week. Linear regression analysis was used to evaluate differences in WORMS grades and T2 measurements between physical activity levels. Covariates included age, sex, BMI, contralateral knee pain and family history for knee replacement.
Results: In asymptomatic subjects without radiographic OA in the study knee at baseline, no associations were found between physical activity levels and focal cartilage lesions or T2 levels in any compartment. However, subjects who met the PAGA recommendations had an increased meniscal lesion score predominantly on the medial side (No. of lesions in medial meniscus $P = 0.004$) and an increased BMEP lesion score (WORMS maximum score, $P = 0.008$) compared to inactive subjects (Table 1). In exploratory analyses of subjects with a BMI <27, significant increases in cartilage T2 relaxation time were found in the lateral femoral cartilage (mean increase: 1.02; 95% CI: 0.01-2.03; p=0.047), the medial tibial cartilage (mean increase: 1.40; 95% CI: 0.38 - 2.44; p=0.007) and in the average of all compartments (mean increase: 0.90; 95% CI: 0.04 - 1.76; p=0.038) in subjects with recommended physical activity levels compared to inactive subjects.
Conclusion: We found that in knees without radiographic OA in asymptomatic subjects, recommended levels of physical activity were associated with increases in meniscal and BMEP lesions compared to inactive subjects. In normal weight subjects, higher activity levels may be associated with early evidence of cartilage degradation. The implications of these findings for long term health of the knee in active individual remains to be determined.

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THE ROLE OF SITE-1 PROTEASE IN THE PATHOGENESIS OF OSTEOARTHRITIS

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Objective: Previous researches have elaborated that osteoarthritis (OA) is a metabolic disease with the epigenetic and proteomic analysis studies for various lipid metabolism-related genes and proteins comparing osteoarthritic cartilage with normal. Site-1 protease (S1P) or subtilisin/kexin-isoenzyme-1 (SKI-1) is a membrane-bound pyrolysin-like serine protease, regulating cholesterol and fatty acids pathways by cleaving Sterol Regulatory Element Binding Proteins (SREBPs), and most recently several experimental studies have provided evidence that S1P is essential for endochondral bone formation and involving in chondrocyte function. However, there has been no report so far on the relationship between site-1 protease (S1P) with OA. Thus, we concentrated on the role and possible mechanism of S1P in the pathogenesis of osteoarthritis.
Material and methods: Cartilage tissues were obtained from total knee arthroplasty for osteoarthritis or total hip arthroplasty for fracture of neck of femur (normal control group). Meanwhile, the normal and osteoarthritic cartilage isolated from of C57BL/6 mice and spontaneous osteoarthritic littermates. Then, immunohistochemical staining and fluorescence quantitative polymerase chain reaction (FQ-PCR) were performed to detect the expression of S1P, SREBP-2, 3-hydroxy-3-methyl-glutaryl-CoA reductase (HMG-CoAR), SOX9, type II collagen and aggrecan. Furthermore, we treated normal chondrocytes with interleukin-1 beta (IL-1β), and evaluated the expression of the above genes and monocyte chemotactic protein-1 (MCP-1).
Results: we found that the expression of S1P, SREBP-2, HMG-CoAR, SOX9, type II collagen and aggrecan in OA patients and normal controls were significantly different, and similar results obtained in the two C57BL/6 mice groups. After induced by IL-1β, normal chondrocytes became hypertrophy-like chondrocytes, and notably, the expression of S1P, SREBP-2, metalloproteinase-1 (MMP-1), metalloproteinase-13 (MMP-13), MCP-1 and HMG-CoAR were upregulated, and SOX9, type II collagen and aggrecan were inhibited in vitro.
Conclusion: These data suggest that provided evidence on the association of S1P with OA pathogenesis. Proinflammatory cytokine IL-1β may influence the hypertrophy and function of chondrocyte through S1P.

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ASSOCIATION BETWEEN THE LOWER SERUM PIICP LEVEL AND THE JOINT SPACE NARROWING ON THE ASYMPTOMATIC KNEE OSTEOARTHRITIS IN MEN IN EARLY FORTIES

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Purpose: The gold standard for assessing joint damage of osteoarthritis (OA) is still the plain radiograph. However, this method only provides a historical view of the skeletal damage that has already occurred. Radiography is relatively insensitive, and does not allow for the early detection of in joint tissues and early joint damage. In joint diseases, there is a loss of the normal balance between the synthesis and degradation of the molecules that provide the articular cartilage with its biochemical and functional properties. Biomarkers are candidates that are now being used to detect and monitor cartilage metabolism for critical assessment of the pathophysiological processes that lead to joint failure in OA patients. Currently, many kinds of biochemical markers associated with the cartilage metabolism have been investigated. Pro-collagen type II C-propeptide (PIICP) is a c-terminal peptide produced in the course of synthesis of type II collagen and can be assayed in synovial fluid and serum by a specific immunoassay (ELISA). It was previously reported that both synovial fluid and serum levels of PIICP were increased in the subjects with doubtful knee OA (Kellgren & Lawrence grading [K/L] grade 0-1). We have also reported that, in contrast to the increase in the urinary levels of cartilage degradation biomarker, C-terminal telopeptides of type II collagen (CTX-II), the serum levels of CPII, which is one of the other cartilage synthesis biomarkers, were decreased in patients with early stage of knee OA (K/L grade 2), where the radiographic joint space narrowing became clear. Based on these results, we hypothesized that the lower cartilage synthesis was associated with the reduction of articular cartilage thickness of the knee joint.
The purpose of this study is to investigate the hypothesis by evaluating whether there is an association between serum levels of PIICP and the radiographic joint space narrowing of the knee joints.
Methods: Fourty seven healthy men volunteers (41.0 y in average) were enrolled in this study. They didn't have any symptoms for knee pain and experience any traumatic episodes for the knee joints. In addition to the basal characteristics of the subjects, a standing, extended antero-posterior view radiograph of both knee and serum levels of PIICP were also measured at the time of study entry. Serum levels of PIICP were measured by ELISA (Uscn life science: SEA964Hu PIICP). Experienced readers read the radiographs independently recorded the radiographic features of K/L grade and joint space width (JSW). JSW was determined at the center point of the medial femoro-tibial compartment on a radiograph using a 0.1-mm graduated magnifying lens. For each participant, the higher K/L grade and the lower JSW of the findings of both knees used for the analysis as targeted knee. The statistical analyses were conducted using the SPSS (SPSS version 17.0). Relationships between JSW and serum levels of PIICP were assessed by multiple linear regression analysis with adjustments for age and body mass index (BMI).
Results: Of 47 subjects, 17 showed a K/L grade 0, 24 showed a K/L grade 1 and 6 showed a K/L grade 2 on radiographs. The serum levels of PIICP was 261.6 pg/mL on average (SD; 81.6 pg/mL), and the JSW in the targeted knee was 4.52 mm on average (SD; 0.94). No significant differences of the serum levels of PIICP were observed between the groups divided by the severity of K/L grade (p=0.352). Multiple linear regression analysis with adjustments for age and BMI showed significant positive correlations between the radiographs JSW and the serum PIICP level (β=0.404, $p = 0.007$).